

WHAT IS CLAIMED IS:

1.           A process device for use on an industrial process control system, comprising  
            an electrical connection configured to couple to a process control loop;  
            output circuitry configured to transmit data on the process control loop;  
            a quiescent current sensor configured to sense quiescent current draw of the process device; and  
            diagnostic circuitry configured to determine a diagnostic condition of the process device as a function of the sensed quiescent current.
2.           The apparatus of claim 1 including a memory which contains a nominal quiescent current value.
3.           The apparatus of claim 1 including a memory which contains a baseline value.
4.           The apparatus of claim 1 wherein the diagnostic condition is a function of temperature.
5.           The apparatus of claim 2 wherein the nominal quiescent current stored in the memory is a function of temperature.

6. The apparatus of claim 3 wherein the baseline value stored in the memory is a function of temperature.

7. The apparatus of claim 1 wherein the quiescent current sensor is configured to sense the quiescent current draw of a subcircuit within the process device.

8. The apparatus of claim 1 wherein the quiescent current sensor includes a sense resistor.

9. The apparatus of claim 1 wherein the quiescent current sensor includes an analog to digital converter.

10. The apparatus of claim 1 wherein the process device is configured to provide an output signal on the process control loop.

11. The apparatus of claim 10 wherein the output signal comprises an analog signal.

12. The apparatus of claim 10 wherein the output signal comprises a digital signal.

13. The apparatus of claim 1 wherein the diagnostic circuitry monitors trends in the quiescent current draw.

14. The apparatus of claim 1 including feature module electronic circuitry and wherein the quiescent current sensor is configured to sense the quiescent current draw of the feature module electronic circuitry.

15. The apparatus of claim 1 including sensing module electronic circuitry and wherein the quiescent current sensor is configured to sense the quiescent current draw of the sensing module electronic circuitry.

16. The apparatus of claim 1 wherein the output circuitry provides an output on the process control loop based upon the diagnostic condition determined by the diagnostic circuitry.

17. The apparatus of claim 16 wherein the output comprises an alarm signal.

18. The apparatus of claim 1 wherein the diagnostic condition is indicative of an impending failure of electronic circuitry in the process device.

19. The apparatus of claim 1 wherein the process control loop comprises a two-wire process control loop.

20. The apparatus of claim 1 wherein the diagnostic circuitry controls operation of electronic circuitry in the transmitter in response to the sensed quiescent current draw of the process device.

21. The apparatus of claim 1 including a visual output and wherein the diagnostic circuitry provides an output on the visual output in response to the diagnostic condition.

22. The apparatus of claim 1 wherein the diagnostic circuitry includes a digital processor.

23. The apparatus of claim 1 wherein the process device is completely with power received through the process control loop.

24. The apparatus of claim 1 wherein the process control loop operates in accordance with HART®, Fieldbus or profibus.

25. The apparatus of claim 1 including a process variable input coupled to a sensor for sensing process variable of an industrial process.

26. The apparatus of claim 1 including a control output coupled to a control element for

controlling a process variable of the process control system.

27. The apparatus of claim 1 wherein the process control loop is selected from the group of process control loops consisting of two-wire loops, three-wire loops and four-wire loops and wireless loops.

28. A method of determining a diagnostic condition of a process device of the type used in industrial process control systems, comprising:

coupling the process device to a process control loop;

outputting data on the process control loop;

monitoring quiescent current draw of electrical components of the process device; and

diagnosing a condition of the electrical component of the process device based upon the monitored quiescent current.

29. The method of claim 28 including comprising the measured quiescent current draw with a nominal quiescent current value.

30. The method of claim 28 including a memory which contains a baseline value.

31. The method of claim 30 wherein the baseline value stored in the memory is a function of temperature.

32. The method of claim 28 wherein the diagnostic condition is a function of temperature.

33. The method of claim 29 wherein the nominal quiescent current draw is a function of temperature.

34. The method of claim 28 wherein the monitored quiescent current draw is the quiescent current draw of a subcircuit within the transmitter.

35. The method of claim 28 including monitoring trends in the quiescent current draw.

36. The method of claim 28 wherein the diagnostic condition is indicative of an impending failure of electronic circuitry in the transmitter.

37. The method of claim 28 including controlling operation of electronic circuitry in the process device in response to the sensed quiescent current draw of the transmitter.

38. The method of claim 28 including completely powering the transmitter with power received from the two-wire process control loop.

39. The method of claim 28 wherein the process control loop comprises a two-wire process control loop.

40. The method of claim 28 including sensing a process variable of the industrial process.

41. The method of claim 28 including providing a control output to a control element to control operation of an industrial process.

42. The method of claim 28 wherein the process control loop is selected from the group of process control loops consisting of two-wire loops, three-wire loops, four-wire loops and wireless loops.